

## Meningococcal Infections

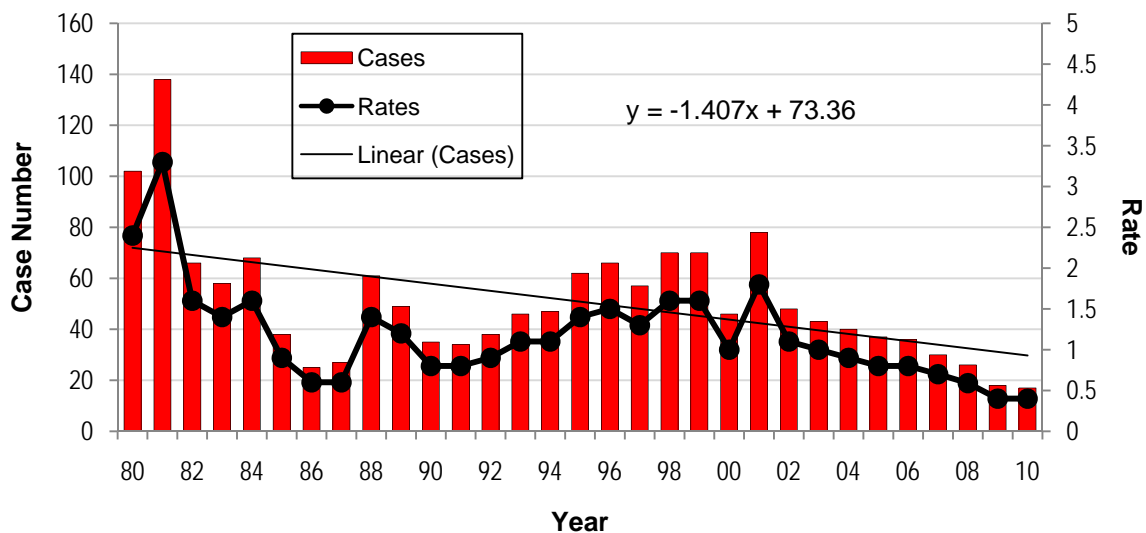
*Neisseria meningitidis* invasive disease is a Class A Disease and must be reported to the state within 24 hours by phone.

Meningococcal invasive disease includes meningococcal meningitis, septicemia, bacteriologically confirmed pneumonia and any other disease with isolation of *N.meningitidis* in internal fluids or organs. *Neisseria meningitidis* (also called meningococcus) is also a common colonizer of the upper respiratory tract. The proportion of healthy carriers is five percent of the population. Carriage is not reportable. Meningococcal meningitis, the most common form of the disease, is characterized by sudden fever onset, with intense headache, nausea and often vomiting, stiff neck and sometimes a petechial rash.

### Incidence and Trends

Cases of meningococcal invasive disease in Louisiana decreased during the eighties, steadily increased during the nineties from a low of 34 cases in 1991 to a high of 78 cases in 2001, with a decrease again occurring in the last nine years. (Figure 1)

Figure 1: Meningococcal meningitis trends - Louisiana, 1980-2010



The incidence rate ranges from a high of 3.3 per 100,000 in 1981 to a low of 0.4 per 100,000 in the past two years. The incidence in recent years is similar to U.S. incidence, which is approximately one per 100,000 per year.

## Serogroups

*Neisseria meningitidis* is a Gram negative diplococcus. A major virulence factor is the capsular polysaccharide, of which there are 13 types. Based on capsular polysaccharide, there are five groups of meningococci which cause most human meningococcus infections. These groups are important to consider because of their epidemiologic, clinical and preventive implications. The three main groups observed in Louisiana are B, C and Y. Groups A and W135 are uncommon in the state. This is important because the quadrivalent vaccine available in the U.S. is effective only against A,C, Y and W135. It is ineffective against B, which represents about one-third of the cases in Louisiana. *N. meningitidis* isolated by hospitals should be sent to the Office of Public Health (OPH) Laboratory for sero-grouping. (Figures 2A and 2B)

Figure 2A: Distribution of serogroups for those known - Louisiana, 1988-2010

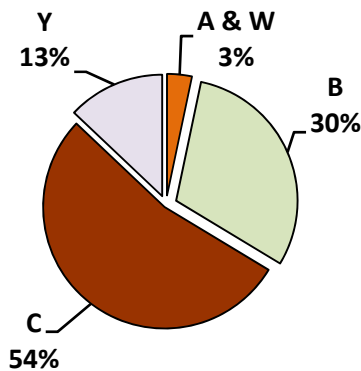
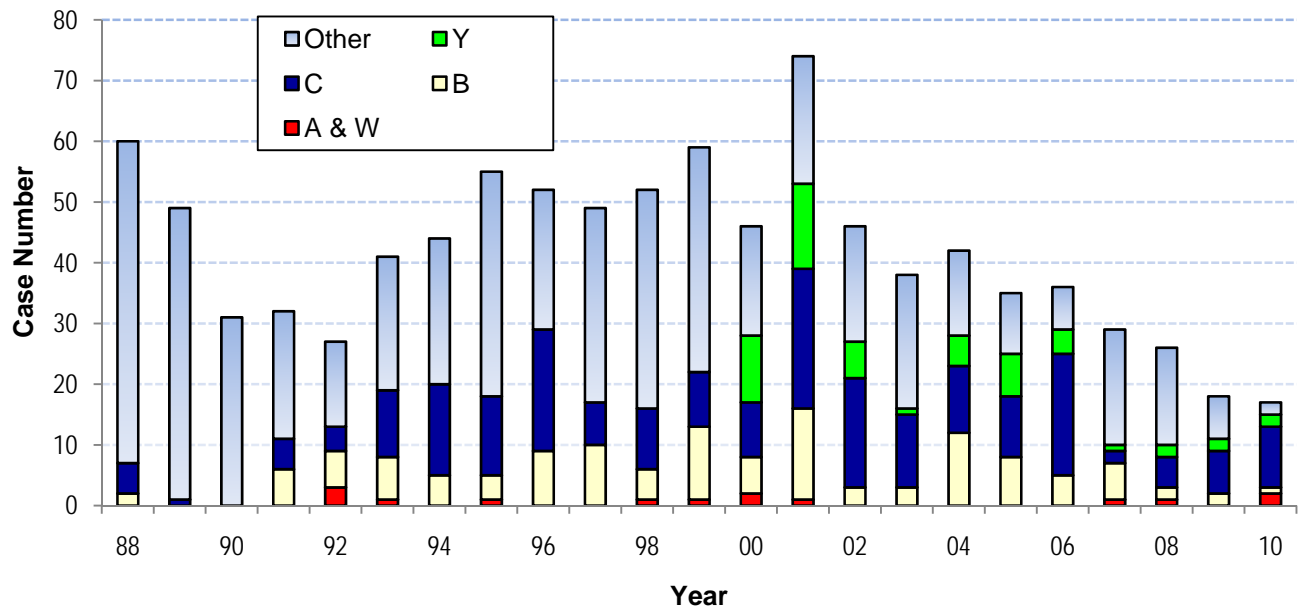


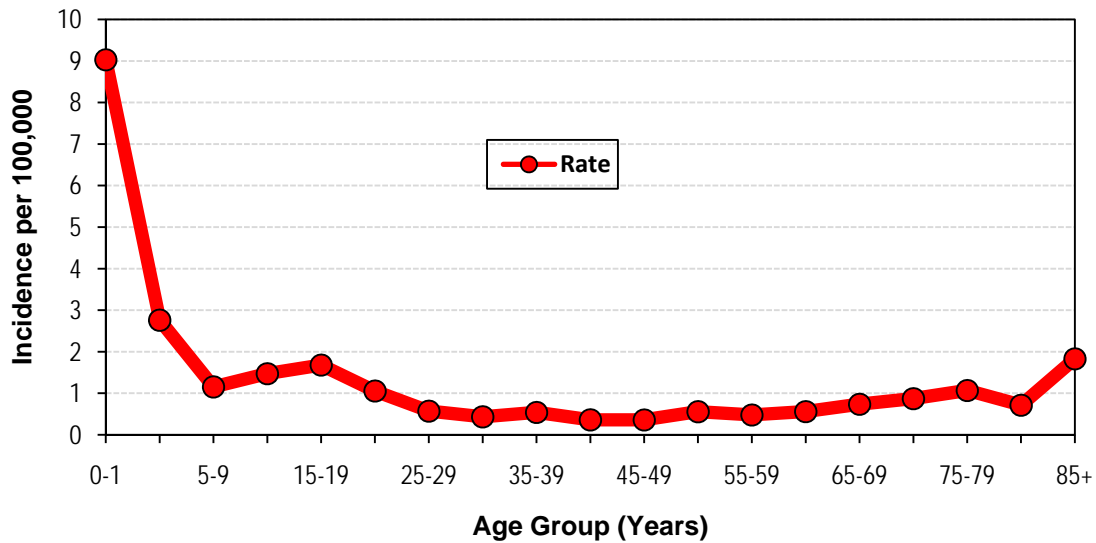
Figure 2B: Distribution of serogroups by year – Louisiana, 1988-2010



## Gender and Age Group Distribution

There is no difference in rates by sex. The age group distribution shows the highest incidence in infancy and early childhood, then decreasing rates until the age of sixty-five years and a slight increase in those older. However the popular perception is that the adolescent and college age groups are at highest risk. This perception results from the publicity given to fatal cases occurring among high school and college students. (Figure 3)

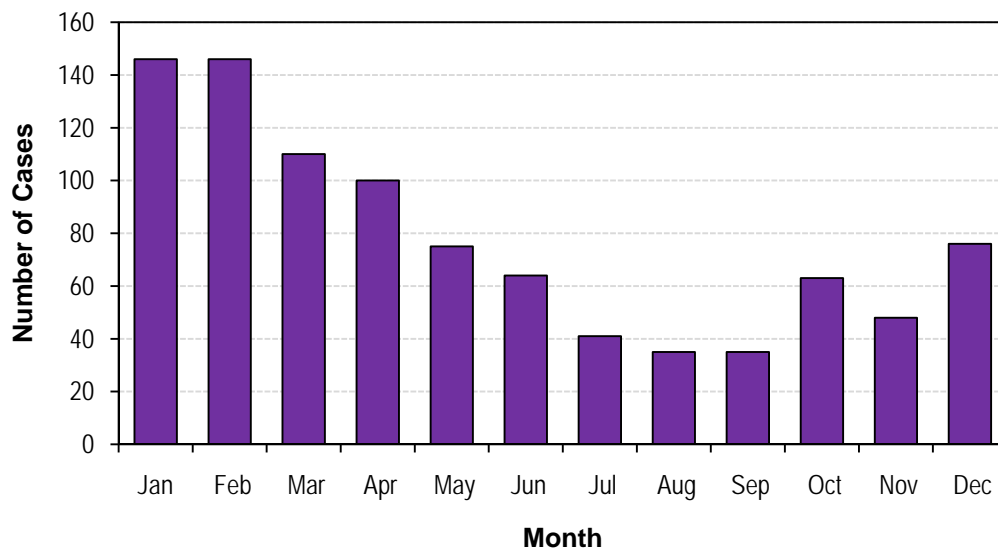
Figure 3: Rate by age group and year – Louisiana, 1990-2010



## Seasonal Distribution

Most cases (53%) occur between January and April. This pattern has been consistent every year. (Figure 4)

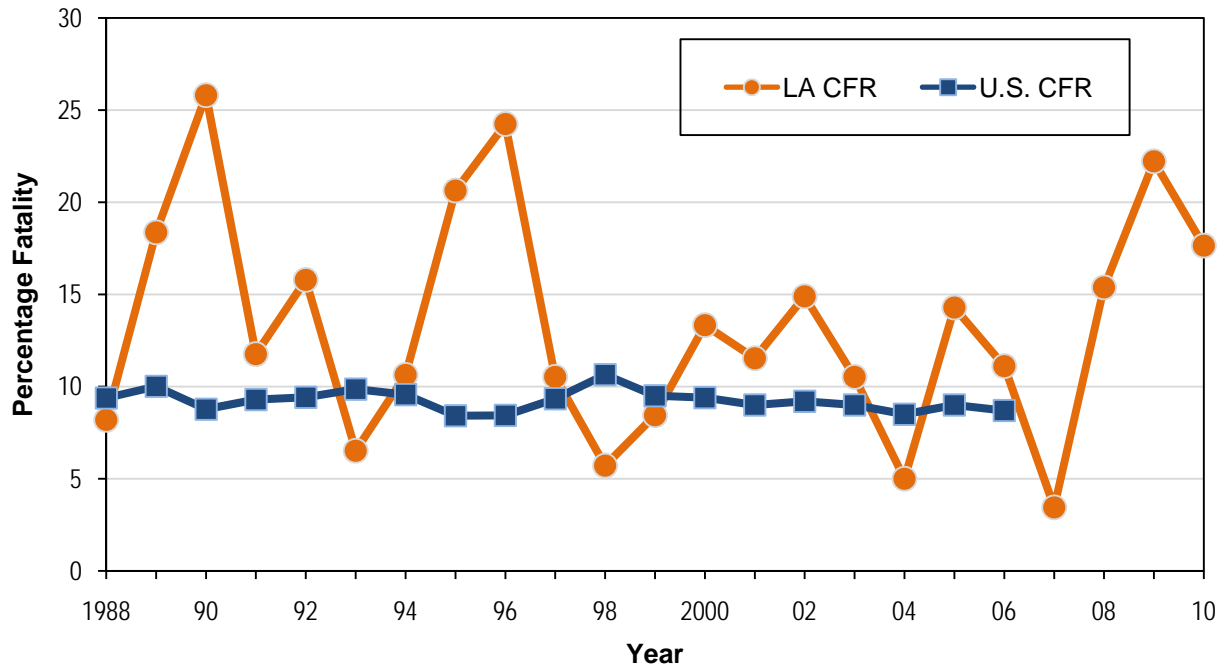
Figure 4: Meningococcal meningitis cases by month – Louisiana, 1990-2010



## Mortality

In spite of the availability of effective antibiotics, the case fatality rate remains high, both in the United States and in Louisiana. The case fatality rate varies widely from between five percent to twenty-five percent from year to year. (Figure 5)

Figure 5: Meningococcal meningitis case fatality rates  
Louisiana versus U.S., 1988-2010



## Genetic Typing

The OPH laboratories began pulsed field gel electrophoresis (PFGE) testing of all strains of *N. meningitidis* received since May, 2001. PFGE is the equivalent of genetic “finger-printing” of strains of *N. meningitidis*. This gives OPH the ability to identify the presence of specific strains in particular areas, to track the progress of these strains, and to issue warnings to medical providers and the public in these areas.

## The 2001 Lethal Strains

In 2001, one particular strain that persisted throughout the year proved to be particularly lethal (four deaths out of eight cases), and “resistant” to vaccine (two vaccine failures out of eight cases). Strains seemed to be limited to some areas of the state. This particular strain was seen in both the Greater New Orleans area and the Rapides (Alexandria) area. (Table 1)

Table 1. *N. meningitidis* cases of lethal strain - Louisiana, 2001

Date	Age	Sex	City	Parish	Comment	Fatality?
02/27/01	17	F	Laplace	St. John		Died
03/21/01	19	F	New Orleans	Orleans	University T	Died
03/26/01	12	M	Boyce	Rapides		Died
04/20/01	19	F	New Orleans	Orleans	University T Vacc	N
05/06/01	7	F	New Orleans	Orleans		N
10/29/2001	12	F	Pineville	Rapides		N
11/9/2001	19	F	New Orleans	Orleans	University T Vacc	Died
11/10/2001	19	F	Pineville	Rapides		N

### The University of Louisiana at Lafayette (ULL) Outbreak

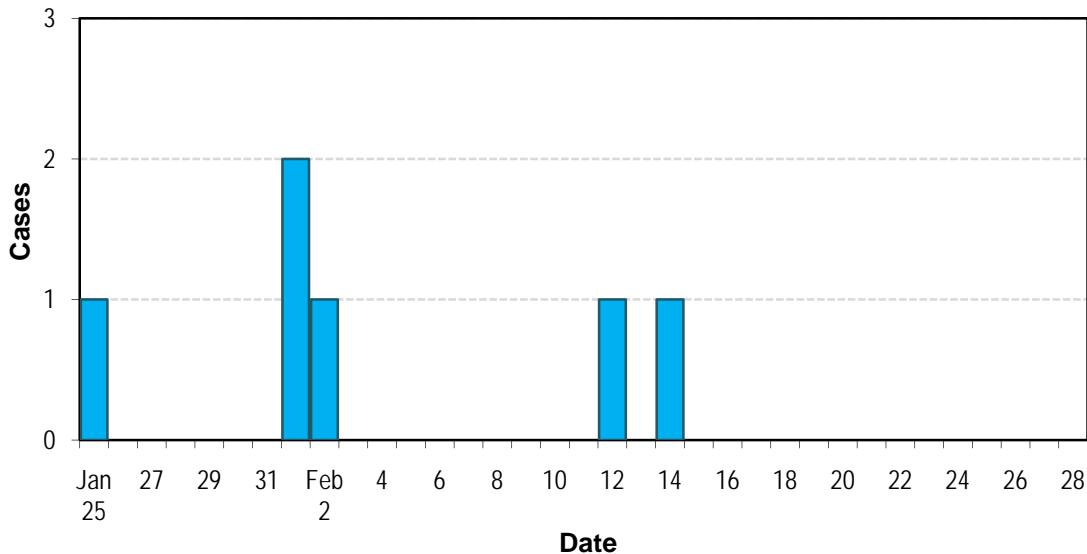
Between January 26, 2006 and February 14, 2006 a total of six cases of meningococcal disease, caused by *Neisseria meningitidis* sero-group C, were reported to OPH. The case investigation identified an organizational outbreak linked to the local university. The population at risk was approximately 17,000 people. Additionally, the attack rate was 29.4 cases per 100,000 population at risk (5 cases/17,000 population at risk)\*100,000 = 29.4/100,000). Only five of the six cases were directly linked to the university. Close personal contacts to the infected individuals were identified as persons who may have been in close prolonged contact such as household members. Antibiotic prophylaxis was recommended only for this high-risk group.

In an effort to prevent the continuation of the outbreak, recommendations were issued for three groups of individuals to get vaccinated with a meningococcal vaccine. The groups identified were members of social organizations including fraternities and sororities, all persons who lived on campus at the university, students, faculty and staff at the university through 20 years of age. As vaccine became available, groups deemed at lower risk were offered vaccinations. Upon completion of the vaccination campaign, 5,000 students received vaccinations through the OPH vaccination clinics. Private providers also provided vaccine for their patients.

This outbreak linked cases through the local university; however, the spread of disease can occur only when individuals are in close personal contact with each other. In some instances this includes sharing items that will facilitate droplet transmission from person-to-person. Casual

contact, such as being in the same classroom, does not put a person at elevated risk or warrant prophylaxis. The recommendation for mass vaccination is not generally considered necessary, but the specifics of the outbreak at this university, required it.

Figure 6: Epidemic curve – ULL outbreak – Louisiana, 2006



### Gibbsland Meningococcal Meningitis Outbreak, February 2009

Between the dates of February 8 and February 19, five confirmed cases of meningococcal meningitis in Gibbsland, LA. were reported to the OPH. Gibbsland is a town of approximately 1,100 people in Bienville Parish. The ages of patients ranged from two years to twenty-one years old and with the exception of the two year-old, who was not confirmed to be related, all cases were relatives or friends who spend time together and all were linked to a local school and a church sleep-over event. PFGE tests done on the four confirmed cases showed the exact same pattern. Common symptoms included high fever, headache, back pain, rash, lethargy and unresponsiveness. One 18 year-old male died within three days of onset of the disease; the other three recovered. Following the outbreak, 38 contacts of the patients were prophylaxed, as well as 49 people from the church sleep-over event. At the school, 158 people were vaccinated on February 20<sup>th</sup> (118 students and 40 staff members).

### Reporting Discrepancies

Since 1999, reporting of meningococcal meningitis has been captured in both the reportable disease database system (RDD) as well as in the Louisiana hospital discharge database (LaHIDD). When comparing the records however, there are some discrepancies with the reported numbers. Between the years of 1999 to 2008, RDD has a total of 461 cases and LaHIDD has a total of 424 cases. When comparing which of those cases are the same, 244 cases

are found in both systems. Cases that are only in RDD number 235 and those only in LaHIDD number 183. Further research is being conducted to determine the reason for this discrepancy.

